

REMARKS

I. Introduction

Claims 8-15 are currently pending in this application. Claim 8 has been amended to further define the subject matter of claim 8, support for which is found, for example on page 19, [0033] of the originally filed specification.

No new matter has been added.

For the following reasons the application should be allowed and passed to issue.

II. Claim Rejections Under 35 U.S.C. § 103(a)

A. Mohanty et al U.S. Patent Publication Number 2003/0216496 (“Mohanty”), or Ohme et al U.S. Patent Publication 2004/024803 (“Ohme”) in view of either Fumitomo JP2002-241566 (“Fumitomo”) or Gilman et al Fire retardant additives for polymeric materials 1. Char formation from silica gel-potassium carbonate. Thirteenth meeting of the UJNR panel of fire research and safety, March 13-20, 1996, vol. 2) (“Gilman”).

Claims 8-10 and 13-15 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over either Mohanty or Ohme, in combination with either Fumitomo or Gilman.

Applicants respectfully traverse the rejection.

Claim 8 recites, in pertinent part, subject matter,

wherein said flame retardancy-imparting component is dispersed in the resin composition and, wherein said flame retardancy-imparting component is supported on an inorganic porous material before it is dispersed in said resin composition.

Similarly, claims 13, 14 and 15 each recite, in pertinent part, subject matter, wherein said flame retardancy-imparting component is dispersed in the resin composition and, wherein said flame retardancy-imparting component is supported on an inorganic porous material.

As such, the flame retardancy-imparting component is supported on the inorganic porous material, before it is dispersed in the resin composition. In other words, the subject matter of the claims require that only after, the flame retardancy-imparting component is first supported on an inorganic porous material that this combination of flame retardancy-imparting component supported on an inorganic porous material is then dispersed in the resin composition.

Indeed, the Examiner at page 3 of the Office Action dated May 27, 2008, concedes that neither Mohanty nor Ohme disclose a flame retardancy-imparting component, but asserts that Gilman teaches a fire retardant on porous silica gel and that Fumitomo teaches a flame retardant on antimonous oxide support. The Examiner then concludes that it would have been obvious to a person having ordinary skill in the art to combine either Gilman or Fumitomo with either Mohanty or Ohme.

Applicants respectfully disagree. The following is a comparison between the cited prior art references and the instant claims.

Mohanty or Ohme in view of Fumitomo

Fumitomo at paragraph [0007] discloses a silica gel holding a hydroxyl group on a fine-porous portion and having a surface with a high adsorption performance in low humidity.

However, Fumitomo does not teach or suggest a configuration in which a flame retardancy-imparting component is supported on an inorganic porous material before it is dispersed in said resin composition.

Nonetheless, the Examiner's asserts that Fumitomo teaches that the amount of highly porous silica with inorganic flame retardant is high "[a]fter mixing, the polymer liquefied at 160°C, which increasing of adsorption of flame retardant on silica,"[sic]. (See Advisory Action dated September 9, 2008 at page 2 referring to Fumitomo paragraph [0007]). Applicants

respectfully submit that Fumitomo does not provide any basis for the Examiner's assertion, and as such, the Examiners assertion is not reasonable.

Applicants disclose that resin composition as recited in the instant claims is obtained by melting the resin component at a high temperature (for example, 180°C as in Example 1 of the instant application), together with the flame retardant.

Moreover, the Yamashita Declaration under 37 C.F.R. § 1.132 filed on August 22, 2008, clearly shows significant differences in flame retardancy between the resin composition comprising a mixture of the flame retardant, inorganic porous material and resin as compared with the resin composition mixed with the combination of flame retardant already supported on the inorganic material, as recited in the claims.

This evidence of unexpected results rebuts the Examiner's assertion of obviousness compared to the closest prior art. Furthermore, the amount of silica gel used in Fumitomo is not necessarily large. According to Fumitomo, the amount of silica gel is preferably in a range of from 1wt% to 20wt% (see Fumitomo at paragraph [0007]), and the range 25-75%, as stated in Fumitomo is the **total** amount of the inorganic substrate, including the silica gel and other inorganic material such as glass fiber, (see Fumitomo at paragraph [0008]). In fact, the Example in Fumitomo discloses that the content of glass fiber is 41wt%, while the content of silica gel is only 5wt%. An English translation of Fumitomo Table 1 is included herewith.

Furthermore, Fumitomo teaches that a certain synergy effect only occurs by using the silica gel, **and** chlorine based flame retardant **and** the fire resistant auxiliary agent together. (See Fumitomo paragraph [0007]. That is, Fumitomo requires that one particular flame retardant and the fire-resistant auxiliary agent be used together with the silica gel. In addition, Fumitomo only shows a reduction in the amount of both of the fire-retardant and the fire-resistance auxiliary

agent as an effect of the use of silica gel. (See Funitomo Table 1). In contrast, the subject matter of the instant claims does not necessarily require a fire-resistant auxiliary agent.

Therefore, neither Mohanty, Ohme nor Funitomo, either alone or in combination teach or suggest all of the elements of independent claim 8. At a minimum, the cited prior art references fails to teach or suggest a configuration in which, “wherein said flame retardancy-imparting component is dispersed in the resin composition and, wherein said flame retardancy-imparting component is supported on an inorganic porous material before it is dispersed in said resin composition.”

Similarly, neither Mohanty, Ohme nor Funitomo, either alone or in combination teach or suggest all of the elements of independent claims 13, 14 and 15, which recite a similar configuration as recited in claim 8.

Accordingly, independent claims 8, 13, 14 and 15 are allowable over Mohanty or Ohme in view of Funitomo.

Furthermore, claims 10-12 depend from, and further define the subject matter of claim 8 and therefore are also allowable over the cited prior art references.

Mohanty or Ohme in view of Gilman

As discussed above, the Examiner concedes that neither Mohanty nor Ohme disclose a flame retardancy-imparting component and therefore Gilman is relied on to ameliorate the deficiencies of Mohanty and Ohme. However, Gilman suffers from a similar deficiency as Funitomo as Gilman also does not teach or suggest, a configuration,

“wherein said flame retardancy-imparting component is dispersed in the resin composition and, wherein said flame retardancy-imparting component is supported on an inorganic porous wherein said flame retardancy-imparting component is supported on an inorganic porous material.”

Gilman, describes "(s)ilica gel combined with potassium carbonate is an effective fire retardant for a wide variety of common polymers ----." Gilman, however, does not teach or suggest an embodiment wherein the potassium carbonate is supported on the silica gel. In the EXPERIMENTAL section on page 261, Gilman teaches additives that include silica gel and potassium which are mixed with the polymers by grinding the powders together in a mortar and pestle (see page 262).

The Examiner asserts, "[b]ased on his results, Gilman teaches that combined inorganic glassy foam, consisting of silica and flame retardant, forms at high temperature, which insulated and slowed escape of volatile decomposition gases." (See Advisory Action dated September 9, 2008, at page 2). However, page 265 of Gilman describes the mechanism during the combustion at a very high temperature. As such, Gilman discloses that the glassy foam is made during combustion. Therefore, Gilman does not teach or suggest a state in the resin composition which has not been burned.

Furthermore, the Examiner asserts that "silica and the retardant composition together forms separate phase in the composition," (see Advisory Action dated September 9, 2008, at page 2). It is respectfully submitted that the description of the separate phase as used in Gilman correspond to the "condensed" phase referred to in the third paragraph on page 265 of Gilman. As such, the "condensed" phase does not mean that the flame retardant is supported on the inorganic porous material since the "condensed" phase is contrasted with the "gas" phase in Gilman (see the last sentence on Gilman page 262). Therefore, Gilman discloses that the silica and K_2CO_3 act in a condensed (that is, liquefied) phase during the combustion and does not imply that K_2CO_3 is supported on or incorporated into the silica gel in the resin composition which has not yet been burned.

Therefore, the Applicants respectfully submit that the Gilman does not disclose a configuration,

- “wherein said flame retardancy-imparting component is dispersed in the resin composition and, wherein said flame retardancy-imparting component is supported on an inorganic porous wherein said flame retardancy-imparting component is supported on an inorganic porous material.”

As such, neither Mohanty, Ohme nor Gilman, either alone or in combination, teach or suggest all of the elements of claims 8 and 13-15.

Accordingly, it is respectfully submitted that claims 8, 13, 14 and 15 are allowable over the cited prior art references.

Furthermore, claims 10-12 depend from, and further define the subject matter of claim 8 and therefore are also allowable over the cited prior art references.

B. Mohanty or Ohme, in combination with Fumitomo or Gilman and further in view of Dorfman

Claims 11 and 12 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Mohanty or Ohme, in combination with Fumitomo or Gilman and further in view of Dorfman US Patent Number 3,983,185. Applicants respectfully traverse the rejection.

As discussed above, at a minimum, neither Mohanty, Ohme, Fumitomo or Gilman, either alone or in combination, teach or suggest a configuration in which “*wherein said flame retardancy-imparting component is supported on an inorganic porous material,*” as recited, in pertinent part in claim 8, 13, 14 and 15.

The Examiner relies on Dorfman for the alleged disclosure of acetylacetonatoiron or acetylacetonatocopper flame retardancy-imparting components.

However, Dorfman fails to ameliorate the deficiencies in Mohanty, Ohme, Fumitomo and

Gilman as Dorfman, because, at a minimum, Dorfman does not teach or suggest a configuration *wherein said flame retardancy-imparting component is supported on an inorganic porous material,* " as recited, in pertinent part in claims 8, 13, 14 and 15.

Moreover, as discussed *supra*, the claimed configuration has unexpectedly superior results.

As such, claims 8, 13, 14 and 15 are not obvious over the cited prior art.

Accordingly, claims 8, 13, 14, and 15 are allowable.

Furthermore, claims 9 and 11-12 depend from, and further define the subject matter of claim 8 and therefore are also allowable over the cited prior art references.

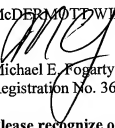
III. Conclusion

In view of the above amendments and remarks, Applicants submit that this application should be allowed and the case passed to issue. If there are any questions regarding this Amendment or the application in general, a telephone call to the undersigned would be appreciated to expedite the prosecution of the application.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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Table 1

	Example 1	Example 2	Comparative Example 1	Comparative Example 2
<組成>				
ジアルキルテレフタレート樹脂	39	39	39	39
反応開始剤	1	1	1	1
ガラス繊維	41	40	42	40
水酸化アルミニウム	0	0	0	10
塩素系難燃剤	6	4	8	4
難燃助剤	6	4	8	4
シリカゲル	5	10	0	0
離型剤	1	1	1	1
着色剤	1	1	1	1
<特性>				
曲げ強さ N/m^2	144	140	145	144
絶縁抵抗(Ω) 煮沸後	2×10^{12}	1×10^{12}	7×10^{12}	8×10^{12}
難燃性 UL 94 厚み 0.5mm	V-0	V-0	V-0	V-1

<Composition>

Diallyl phthalate resin

Reactional initiator

Glass fiber

Aluminum hydroxide

Chlorine-based fire retardant

Fire-resistant auxiliary agent

Silica gel

Release Agent

Colorant

<Properties>

Bending strength N/m^2 Insulation resistance (Ω)

Flame retardancy after boiling

UL 94 Thickness 0.5mm

[0013] (Notes of table)

"DAPPUS" Diallyl phthalate resin: By DAISO

reactional initiator: — dicumyl peroxide glass fiber: — the mean fiber diameter of 11 micrometers, and made in [of 3 mm of fiber length] a chopped strand chlorine-based fire retardant: oxy dental chemical "DEKURO lamp lath"

"PATOX-M" (antimonous oxide) A fire-resistant auxiliary agent: By NIHON SEIKO

silica gel: — mean-particle-diameter [of 4 micrometers], and specific surface area 700m²/g, and oil absorption of 95 ml (per 100g)

release agent: — calcium stearate colorant: — carbon black [0014] (Measuring method)

1. Bending strength and insulation resistance 3. fire retardancy by JIS K 6911 It is based on UL94. [0015] To the comparative example 1 which is the conventional combination which does not use silica gel, Example 1 and Example 2 reduced the amount of a halogen series flame retardant and the antimonous oxide used, and they were able to acquire equivalent fire retardancy from the result of Table 1, without spoiling an electrical property and a mechanical property by blending silica gel instead. On the other hand, fire retardancy was not able to be acquired although it tried to use for the comparative example 2 aluminum hydroxide which is a common fire-resistant auxiliary agent instead of silica gel.

[0016]

[Effect of the Invention] This invention is a diallyl phthalate molding material which contains 15 to 70 % of the weight of diallyl phthalate resin, and 75 to 20 % of the weight of inorganic substrates as an essential ingredient, and contains silica gel as an inorganic substrate to the whole molding material.

Mold goods excellent in a mechanical characteristic, an electrical property, and fire retardancy can be obtained reducing an environmental impact etc.

Therefore, since the diallyl phthalate molding material of this invention can manufacture easily the mold goods of the electric electronic component which needs these characteristics, it is preferred as an industrial diallyl phthalate molding material.